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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/674,722      | 09/30/2003  | Young-Kai Chen       | 30-4                | 3993             |

7590 01/24/2007  
Docket Administrator (Room 3J-219)  
Lucent Technologies Inc.  
101 Crawfords Corner Road  
Holmdel, NJ 07733-3030

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| EXAMINER |
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PHAN, HANH

|          |              |
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| ART UNIT | PAPER NUMBER |
|----------|--------------|

2613

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE  | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS                               | 01/24/2007 | PAPER         |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/674,722 | <b>Applicant(s)</b><br>CHEN ET AL. |  |
|                              | <b>Examiner</b><br>Hanh Phan         | <b>Art Unit</b><br>2613            |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.  
 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-20 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 01 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 1-20 are objected to because of the following informalities:

-In claim 1, line 2, the phrase " a subcarrier" should be changed to -- an unmodulated optical subcarrier--. Appropriate correction is required.

-In claim 1, line 7, the phrase "inphase and quadrature components" should be changed to -- inphase and quadrature phase components--. Appropriate correction is required.

-In claim 11, lines 2 and 3, the phrase " a subcarrier" should be changed to -- an unmodulated optical subcarrier--. Appropriate correction is required.

-In claim 14, line 6, the phrase " electro-optical modulators" should be changed to -- electro-optical phase shifters--. Appropriate correction is required.

-In claim 18, line 3, the phrase " an optical carrier" should be changed to -- an optical subcarrier with an unmodulated optical subcarrier--. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-In claim 1, the phrase "a coherent optical carrier having a **subcarrier**" is undefined. How the subcarrier is generated.

-In claim 11, the phrase "an optical carrier with a **subcarrier**" is undefined. How the subcarrier is generated.

-In claim 18, the phrase "**a modulated subcarrier**" is undefined. How the subcarrier is generated.

-Claim 18 recites the limitation "**the subcarrier**" in line 12. There is insufficient antecedent basis for this limitation in the claim.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cho et al (Pub. No.: US 2003/0058504).

Regarding claims 1, 11 and 18, referring to Figure 11, Cho et al teaches a method for transmitting digital data, comprising:

splitting (i.e., optical splitter 29, Fig. 11) a coherent optical carrier (i.e., light source 27, Fig. 11) having a subcarrier into mutually coherent optical carriers (i.e., pages 9 and 10, paragraphs [0126]-[0132]) ;

producing (i.e., optical phase modulators 31, Fig. 11) sequences of phase shifts in each of the mutually coherent optical carriers (i.e., pages 9 and 10, paragraphs [0126]-[0132]);

interfering (i.e., combiner 33, Fig. 11) the mutually coherent optical carriers to produce an output optical carrier whose subcarrier has modulated inphase and quadrature components with a corresponding sequence of pairs of values (i.e., pages 9 and 10, paragraphs [0126]-[0132]); and

wherein the pairs of values of the modulated inphase and quadrature phase components produced by the interfering correspond to coordinate pairs for the signal points of one of the 4-PSK 2D constellation, the 16-QAM 2D constellation, and the 16-PSK 2D constellation (i.e., pages 9 and 10, paragraphs [0126]-[0132] and page 8, paragraph [0107]).

Regarding claims 2, 12 and 13, Cho et al further teaches the pairs of values produced by the interfering correspond to the signal points to about 5% or better (i.e., Fig. 11, pages 9 and 10, paragraphs [0126]-[0132] and page 8, paragraph [0107]).

Regarding claims 3, 4 and 20, Cho et al further teaches the signal points represent the 4-PSK 2D constellation or represent one of the 16-QAM constellation

and the 16-PSK constellation (i.e., Fig. 11, pages 9 and 10, paragraphs [0126]-[0132] and page 8, paragraph [0107]).

Regarding claims 5 and 16, Cho et al further teaches the splitting forms four mutually coherent optical carriers and the producing makes sequences of phase shifts on the four mutually coherent optical carriers (i.e., Fig. 11, pages 9 and 10, paragraphs [0126]-[0132] and page 8, paragraph [0107]).

Regarding claims 6, 15 and 19, Cho et al teaches further comprising producing a time delay (i.e., optical delay 39, 39',..., Fig. 11) of the subcarrier of each mutually coherent optical carrier between performing the steps of splitting and interfering, magnitudes of differences between the time delays for different ones of the mutually coherent optical carriers differing from an integer number of subcarrier periods by at least 0.1 times the subcarrier's period.

Regarding claim 7, Cho et al further teaches the producing further comprises: passing each mutually coherent optical carrier through a separate electro-optical phase shifter (i.e. optical phase modulators 31, Fig. 11) while supplying a sequence of control voltages to the electro-optical phase shifters to produce the sequence of modulations thereon (i.e., Fig. 11, pages 9 and 10, paragraphs [0126]-[0132] and page 8, paragraph [0107]).

Regarding claims 8-10 and 14, Cho et al teaches further comprising:

splitting (i.e., splitter 29, Fig. 11) the coherent optical carrier into four mutually coherent second optical carriers;

producing (i.e. phase modulators 31, Fig. 11) second sequences of second phase shifts on each of the mutually coherent second optical carriers; and

then, interfering (i.e., combiner 33, Fig. 1) the mutually coherent second optical carriers to produce a subcarrier having a second sequence of pairs of modulated inphase and quadrature components; and

wherein the pairs of values of the modulated inphase and quadrature phase components of the second sequence correspond to coordinate pairs for the signal points of one of the 4-PSK 2D constellation, the offset 4-PSK 2D constellation, and the trapezoid 2D constellation (i.e., Fig. 11, pages 9 and 10, paragraphs [0126]-[0132] and page 8, paragraph [0107]).

Regarding claim 17, Cho et al teaches the controller is configured to receive digital data and to cause the modulation of inphase and quadrature phase components of the subcarrier with two or more bits of digital data per symbol interval (i.e., Fig. 11, pages 9 and 10, paragraphs [0126]-[0132] and page 8, paragraph [0107]).

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (571)272-3035.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Art Unit: 2613

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

*Hanh Phan*  
**HANH PHAN**  
**PRIMARY EXAMINER**